

# Overcoming Barriers to Widespread CCS Deployment

with a focus on CO<sub>2</sub> capture

Edward S. Rubin

Department of Engineering and Public Policy  
Department of Mechanical Engineering  
Carnegie Mellon University  
Pittsburgh, Pennsylvania

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# Why CCS is Needed

- Achieving climate change goals will require LARGE reductions in GHG emissions by 2050, especially CO<sub>2</sub>.
- Fossil fuel power plants emit ~40% of U.S. CO<sub>2</sub>. They also provide 70% of all U.S. electricity. They cannot be easily or quickly replaced by low-carbon alternatives.
- CCS is the only way to get large (85-90%) CO<sub>2</sub> reductions from fossil-fueled power plants, while we transition to a more sustainable energy economy.
- CCS also can reduce emissions from the transportation sector as it adopts vehicles powered by electricity.
- Without CCS the cost of mitigating climate change will be much higher, especially as climate goals tighten.

# President Obama's Charge to the Interagency Task Force on CCS

To: DOS, Treasury, DOJ, DOI, DOC, DOL, DOT, DOE, EPA, FERC, OSTP, CEQ Re:  
**A Comprehensive Federal Strategy on Carbon Capture and Storage**

“... I hereby establish an Interagency Task Force on Carbon Capture and Storage...  
Co Chaired by the...Department of Energy and the Environmental Protection Agency.

The Task Force [of senior officials from each designated agency] shall develop within 180 days... a proposed plan to overcome the barriers to the widespread, cost-effective deployment of CCS within 10 years, with a goal of bringing 5 to 10 commercial demonstration projects online by 2016. The plan should explore incentives for commercial CCS adoption and address any financial, economic, technological, legal, institutional, social, or other barriers to deployment. The Task Force should consider how best to coordinate existing administrative authorities and programs, including those that build international collaboration on CCS, as well as identify areas where additional administrative authority may be necessary.”

- *Barack Obama, February 3, 2010*

## Task 1. Overcome barriers to widespread, cost-effective deployment of CCS within 10 years

### *A Simple Truth:*

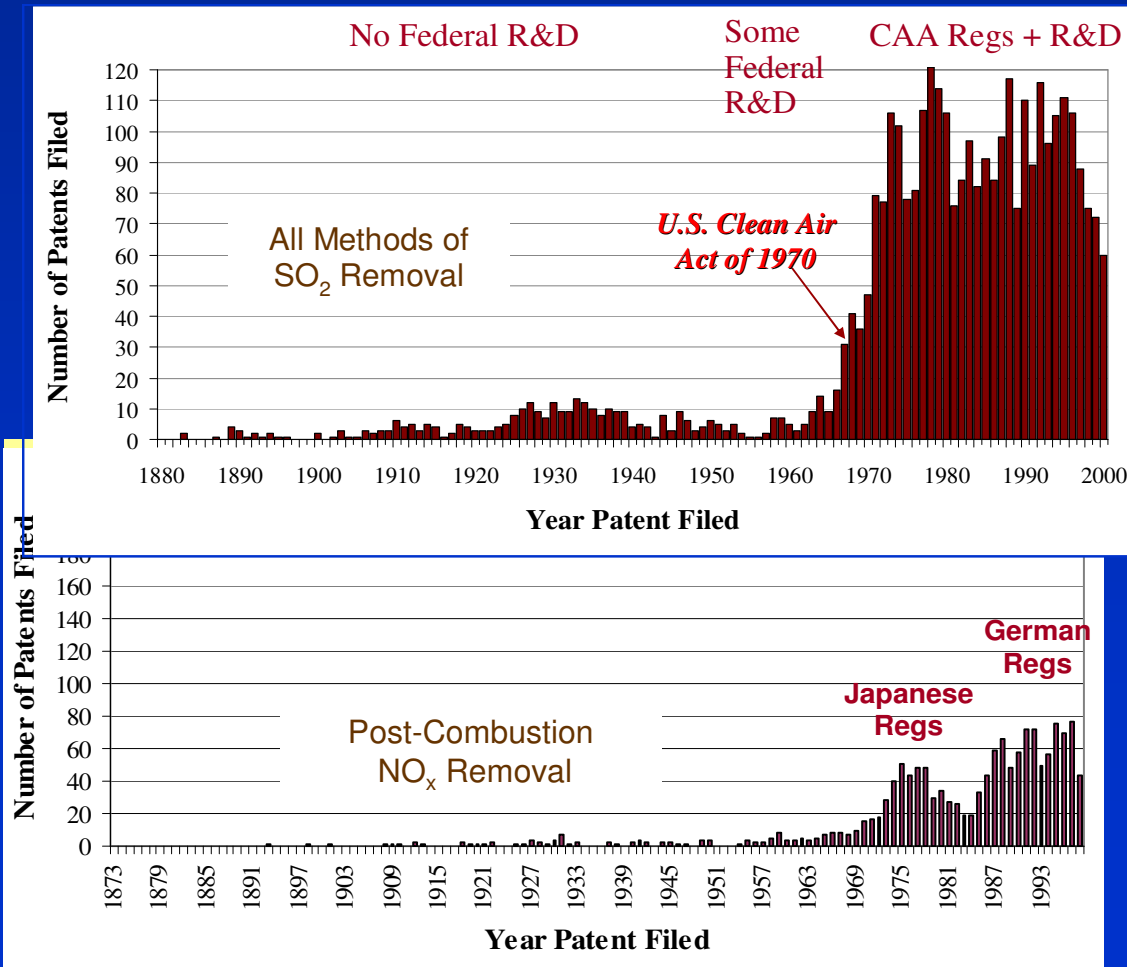
- CCS will not be widely deployed and developed unless and until there is a market for such systems established by a **strong policy driver** that significantly limits CO<sub>2</sub> emissions from fossil fuel power plants.

# A Suggested Approach

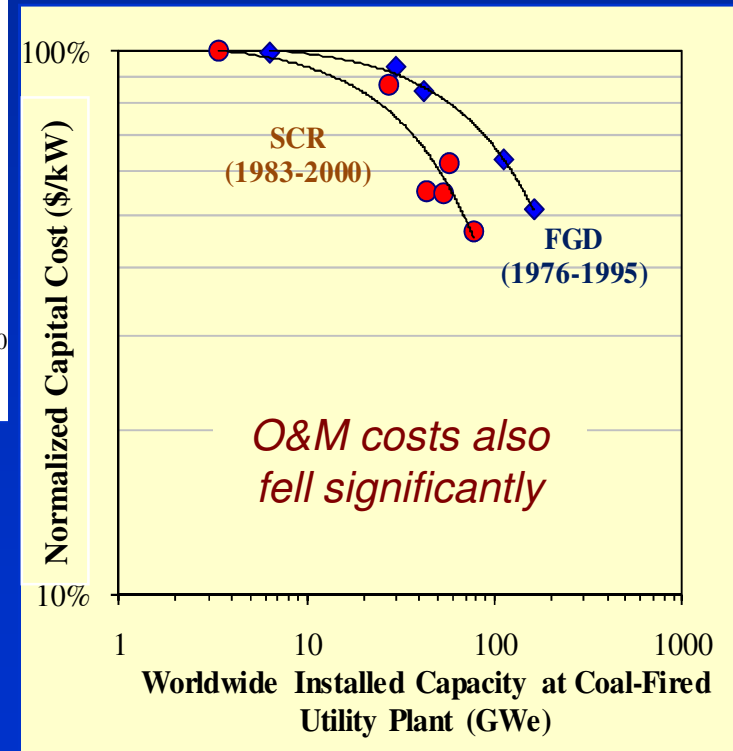
- Develop and promulgate **performance standards** for new fossil fuel power plants that require some degree of CO<sub>2</sub> capture for compliance
- Revise the standards periodically as CCS technology develops, and extend them to existing plants that are still operating after a specified period of time
- Provide additional incentives for capture technology innovation by establishing a **market price on carbon** that rewards “over-compliance” by allowing excess emission reductions to be banked or sold.

# A market for CO<sub>2</sub> capture will stimulate innovation and reduce costs

## Inventive activity in SO<sub>2</sub> and NO<sub>x</sub> capture



## Reductions in FGD and SCR capital cost



## Task 2. Bring 5 to 10 commercial demonstration projects online by 2016

- Full-scale demonstrations are critical to achieving acceptance of CCS by both industry and the public.
- While a number of important legal and regulatory issues must be resolved (related mainly to geological storage), I believe the largest impediment to bringing 5 to 10 full-scale technology demonstrations online by 2016 is a lack of adequate financing.
- At a cost of roughly one billion dollars per project for a typical 400 MW power plant, current federal funding cannot guarantee 5-10 full-scale projects. Substantial industry cost sharing is needed, but not guaranteed.

# A Suggested Approach

- Focus on getting the five projects selected under the CCPI program built and operating as soon as possible.
- Focus first on demonstrating the effectiveness, safety, and reliability of CCS technology at the scale typical of commercial power plants ( $\geq 3$  Mt CO<sub>2</sub>/yr).
  - Reducing the cost of CO<sub>2</sub> capture will certainly be important for widespread deployment; but it should not be the focus of these initial full-scale demonstrations. Focus on performance.
- Secure \$3-5 billion for additional full-scale power plant demonstration projects:
  - PC plants with  $\geq 3$  MtCO<sub>2</sub>/ yr; At least one NGCC plant.



## Task 3. Explore incentives for commercial CCS adoption

- Again, the biggest incentive for commercial CCS adoption will be a market for CCS established by performance standards and/or a sufficiently high price on carbon emissions. Lacking that, ...
- Consider ways to ameliorate concerns about regulatory and legal issues (such as long-term liability) for early commercial projects
- Consider a higher level of federal cost-sharing for **full-scale** demonstrations at coal-fired power plants
- Consider financial incentives (e.g., \$xx/ton) for CO<sub>2</sub> captured and stored at a rate exceeding 2 MtCO<sub>2</sub>/yr

# For Additional Details and Recommendations Please See ...

- *Policy Briefs*, CCS Regulatory Project, Carnegie Mellon University, et al., [www.CCSReg.org](http://www.CCSReg.org) (May 2010)
- *Prospects for Improved Carbon Capture Technology*, Congressional Research Service (forthcoming, May 2010)
- *Power plant CO<sub>2</sub> capture technologies: Risks and risk governance deficits*, International Risk Governance Council, Geneva (December 2009)
- *A Performance Standards Approach to Reducing CO<sub>2</sub> Emissions from Electric Power Plants*, Pew Center on Global Climate Change, Arlington, VA (June 2009)
- *A Trust Fund Approach to Accelerating Deployment of CCS: Options and Considerations*, Pew Center on Global Climate Change, Arlington, VA (January 2008)

*Thank You*

*rubin@cmu.edu*